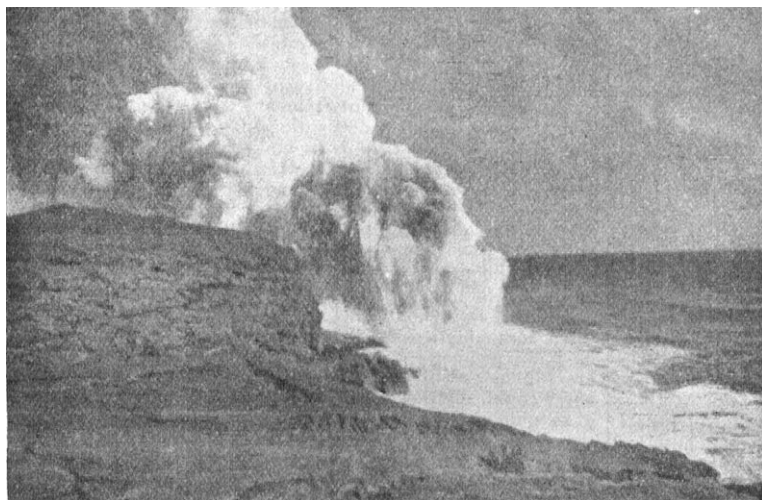


THE ERUPTION OF MATAVANU IN SAVAI, 1905-6.

THE last-issued number of the *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* contains an account of a very remarkable volcanic eruption which had been in progress for more than twelve months in September last in the island of Savaii. The volcanoes of this island had been quiet for more than a century when, in 1902, two minor outbreaks occurred, and in 1905 a greater eruption commenced, causing so much anxiety and alarm that the German Colonial Administration sent to Prof. K. Sapper, of Tübingen, a collection of specimens, photographs, and newspaper and other reports, from which he has compiled an account which is interesting in spite of its inevitable incompleteness.

The eruption was ushered in by a series of earthquakes lasting from July 25 to August 1, 1905; at half past nine on the night of the last-mentioned date a loud detonation



Lava flowing under its consolidated upper crust into the sea near Salago, September, 1906.

was heard, and shortly after "pillars of fire" were seen issuing from a valley known as Matavanu, some 12 kilometres from the coast on the north-eastern side of the island. At first the eruption was of an explosive character, and does not seem to have been very violent, as the estimates of the height to which matter was thrown do not exceed 200 metres, and the hill formed was never more than 150 metres in height. On August 9 lava began to flow, at first in small quantities, afterwards more abundantly, until it reached the coast on December 6, and flowed down to the sea at intervals up to the end of September, 1906, the date of the latest reports received by Prof. Sapper. During this period the outflow of lava seems to have been continuous, though varying in amount, and unaccompanied by any considerable degree of explosive activity.

Many people visited the volcano during the eruption, and an interesting account by Dr. Grevel is reprinted from the local newspaper; his party made the ascent on April 23 last, over the crust of the lava stream, which was smooth and easily traversed, and cool enough for the Samoans who accompanied him to walk over it. The solid surface of the lava stream was broken at intervals by vent holes, the one nearest the crater being at first mistaken for a parasitic cone, as the crust of the lava rose in a gentle convexity to the orifice, which was much smaller in diameter than the cavity underneath. Thick, sulphurous vapours prevented any sight into the cavity, and large stones thrown in gave no clue to its depth, as their fall was unheard. Four of these vent holes were examined, which repeated the features of the first on a smaller scale, and the party then climbed to the crater by an easy ascent over the lava flow on the northern side. Owing to the drift of the south-east trade wind, no view of the crater

could be obtained, so Dr. Grevel and his party worked round by the east, where the surface was covered with countless bodies of moths, attracted by the glow of the crater and killed by the vapours rising from cracks in the surface of the lava flow; the same vapours had proved fatal to a flying-fox, a dove, and a sea-gull. From the southern edge a good view of the crater was obtained; it was about 300 metres in diameter, filled with a lake of molten lava in gentle ebullition, caused by the rise of steam bubbles, and from the centre a gentle streaming to the north commenced, which increased in rapidity until the lava disappeared in a cataract into a cloud of steam, and presumably joined the stream over the surface of which the party had ascended.

On reaching the sea, the lava flowed out to the reef, where its end, being cooled by the surf, formed a wall between which and the coast the lava flowed quietly along the lagoon. At its end the sea was in violent ebullition, dense clouds of steam were formed, and for

100 metres from the end of the flow the sea was boiling hot, and fishes, killed and cooked by this boiling sea-water, were collected and eaten by the natives. In a few places the lava flowed over the reef into the deep water outside, and where this occurred its progress was marked by violent geyser-like explosions, which were mistaken by some people for fresh volcanic eruptions, but were in reality due to steam formed under the still liquid lava. We reproduce a very striking photograph of one of these geyser-like explosions at the front of a lava stream flowing into the deep sea. The lava was remarkable for its fluidity, and issued in great quantity; according to a map attached to Prof. Sapper's paper, the area covered by the lava extends about 6 kilometres to the west and 12 kilometres to the north-east of the volcano, and has a width of from 2 kilometres to 5 kilometres; it has filled the lagoon for about 8 kilometres along the coast, destroying several villages and rendering others uninhabitable by cutting off their water supply, while

several small promontories of lava were thrust forward beyond the reef.

RESEARCH IN TROPICAL MEDICINE AND HYGIENE.¹

(1) THE greater part of the first report is occupied with an elaborate memoir by Drs. Thomas and Breinl on trypanosomes, trypanosomiasis, and sleeping sickness. It comprises a description of cases of sleeping sickness, a full account of inoculation experiments with the *Trypanosoma gambiense*, from which the conclusion is formulated that the trypanosomes of sleeping sickness of Uganda and of the Congo Free State and of trypanosomiasis are identical, together with an account of the pathological anatomy and histology of trypanosomiasis, the action of various drugs on trypanosomes, and experiments with the trypanosomes of surra, mal de caderas, dourine, &c.

The late Mr. Dutton and Dr. Todd contribute an important memoir on human tick fever in the Congo Free State, with an appendix by Mr. Newstead on the anatomy of the tick (*Ornithodoros moubata*) which conveys the disease.

¹ (1) "The Thompson-Yates and Johnston Laboratories Report." Edited by Robert Boyce and Charles Sherrington, with H. E. Annett, Benjamin Moore, Ronald Ross and E. W. Hope. Pp. 141. Vol. vi. (New Series), Part ii., December, 1905.

(2) *Ibid.* Vol. vii., Part i., February, 1906. Pp. 88+plates.

(3) "Rapport sur l'Expédition au Congo, 1903-5." Par J. Evérest Dutton and John L. Todd. (École de Médecine Tropicale de Liverpool, Mém. xx.) Pp. 72. (All published for the University Press of Liverpool, by Williams and Norgate, London, 1906.) Price 5s.

(4) "Second Report of the Wellcome Research Laboratories at the Gordon Memorial College, Khartoum." By Andrew Balfour.

Lastly, Surgeon Ross, R.N., contributes a short paper on the habits of the marine mosquito (*Acartomyia zammiti*).

(2) The second report contains papers on a new species of louse (*Haematopinus stephensi*) which acts as the intermediary host of a new hæmogregarine parasite in the blood of the Indian field rat, by Mr. Christophers and Mr. Newstead; a note on the anatomy of *Gastrodiscus hominis*, a human fluke, by Dr. Stephens; a revision of the Sarcopsyllidæ, by Dr. Karl Jordan and the Hon. N. C. Rothschild, a family of fleas which includes the jigger, and the rat flea supposed to transmit plague to man; and a description of the maiotic process in Mammalia, by Messrs. Moore and Walker. The last-named paper is illustrated with a number of beautiful plates, and is well worthy of study.

(3) In this report the late Mr. Dutton and Dr. Todd, after some general remarks on the conditions favouring the spread of malaria, describe the conditions existing at some of the towns and posts of the Congo Free State, and formulate recommendations for remedying these. Dr. Breinl and Mr. Kinghorn describe experiments showing that the *Spirochaeta* of African tick fever is infective for the horse, dog, rabbit, guinea-pig, rat, and mouse in addition to monkeys, whereas the *Spirochaeta obermeieri* of relapsing fever is infective for monkeys only. Dr. Breinl has also compared the immunity produced by these two *Spirochaetes*, and finds that each strain produces considerable active immunity against re-infection, but does not produce immunity against infection with the other strain. The course of the disease also varies with the two strains, and the conclusion, therefore, is that tick fever and relapsing fever are produced by different species of *Spirochaetes*.

(4) The second report of the Wellcome Research Laboratories of the Gordon College, Khartoum, by Dr. Andrew Balfour, the director, maintains the high standard of the first one (see NATURE, vol. lxxi., p. 605), both as regards the nature of the work recorded and the manner in which it is presented to the reader. Nearly half the volume comprises records of mosquito work in Khartoum, of biting and noxious insects, mosquitoes, and other human, animal, and vegetable pests of the Sudan. Dr. Balfour describes a hæmogregarine parasite of the jerboa and a leucocytozoon of mammals, and contributes a report on cattle and equine trypanosomiasis in the Anglo-Egyptian Sudan. Fortunately, human trypanosomiasis and sleeping sickness do not yet seem to be endemic in this part of Africa, nor has the tsetse-fly which conveys it (*G. palpalis*) been described here. In the chemical laboratory a considerable amount of work has been done by Dr. W. Beam, the chemist, on water analysis, Sudan grains and gums, &c. The travelling naturalist, Mr. Sheffield Neave, records many interesting observations on blood, blood parasites, &c., of birds, fish, and other animals.

R. T. HEWLETT.

PRESIDENTIAL ADDRESSES AT THE NEW YORK MEETING OF THE AMERICAN ASSOCIATION.

A GENERAL article upon the proceedings of the American Association for the Advancement of Science at the meeting held at New York during the Christmas vacation appeared in NATURE of January 24 (p. 304). Through the kindness of the general secretary of the association, Dr. L. O. Howard, we have received copies of several of the addresses delivered by the president and by the chairmen of sections, but limitations of space will not permit us to publish any of them in full. The subjoined extracts from these addresses will, however, afford an indication of the subjects considered and the views expressed.

EDUCATIONAL THEORIES, ANCIENT AND MODERN.¹

The Greek idea of education and culture was based upon the existence of a privileged class, fed, clothed, and sheltered by the labour of slaves—a real aristocracy devoted

¹ From an address delivered by Prof. C. M. Woodward, president of the American Association.

to war, art, literature, and luxurious living. The sway of the so-called classic idea of education has been, and still is, one of the marvels of history. The splendour of Greek art, the brilliancy of Greek literature, and the keenness of Greek logic, have held the world as in a trance, unable to break away from its charms—though it has been unsuited to other peoples and other social conditions.

Francis Bacon more than any other man showed the inadequacy of the classic method, fine as it was along certain lines, and the comparative worthlessness of scholasticism, and he opened the eyes of the educated people of his time to the wealth of opportunity for interesting and profitable study in the great laboratory of nature, and, better than all else, he set forth the dignity and intellectual value of science study, and vigorously scouted the idea that the usefulness of scientific truth in any degree detracted from its educational value.

But none of the writers touching on education, with the possible exception of Froebel and Pestalozzi, not even Locke, Milton, or Dr. Samuel Johnson, looked at the matter from the scientific standpoint, which takes into account, first, the physiological laws which govern the growth and development of the brain; secondly, the exterior stimuli for promoting that growth most successfully; and, thirdly, the kind and quantity of knowledge and skill one must have in order to meet most completely the demands of a carefully selected occupation.

Every good teacher aims to make his subject as interesting as possible to his pupils. If they fail to take a lively interest in it, something is wrong; either it is not properly presented, or it is over their heads, or it is clearly of no earthly use. Natural lack of capacity on the part of the child is rarely a valid reason for failure if the child be healthy and normal. I have learned to discredit the truth of the oft-told tale that "John has no capacity for" such a subject—mathematics, for example. "He never could learn mathematics—he takes no interest in algebra, and he hates geometry," &c. Our higher schools and colleges are full of young people who protest vigorously that they never could, and never can, understand or take any pleasure in or gain any profit from certain studies. I firmly believe that every normal person, at least nine out of ten of the children and youth at school and college, can fairly master and actually enjoy and profit by, not only mathematics, but by every subject in the curriculum if it be properly taught, and under proper conditions as to age and preparation.

Attention is as necessary to the growth and development of the brain as exercise is to the development of a muscle, and interest is the condition of a lively attention. When in a school or lecture-room the limit of close attention is reached, the lesson or lecture should close, for the educational process has already stopped. It is not only useless, but it is worse than useless, to go on when the class or audience refuses for any reason to attend. I therefore doubt the educational value of subjects which are not, and perhaps cannot be, made interesting.

Of course I do not claim that all selected studies can be made equally interesting, or that any one study can be made equally interesting to all pupils, even when the pupils are properly graded, but I do claim that a lively interest is necessary, and that educational progress is very nearly proportional to the strength of that interest.

Perhaps the most valuable contribution to the science of education has come through a study of the laws which obtain in the growth and development of the brain, and the conditions under which that growth and development is most healthy and complete. There are times and seasons for the development of the mental and moral faculties as there are of the physical faculties. While such times and seasons are not precisely the same for all children, we find that all attempts at premature development are not only worthless, but are permanently injurious. Precocity is now regarded as a species of brain deformity. Plants and animals may be forced, and unusual and interesting results may be produced by forcing, but no one of us wishes a son or a daughter to be a prodigy in one direction at the cost of normal development in other directions.

The psychologists tell us that the brain cells develop as do other physical organs, not only through thought,